ARBITRATION SCHEMES OF WISHBONE ON-CHIP BUS SYSTEM

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ABSTRACT

In the SoC development, the compatibility of IP cores is one of the challenges that need to be addressed carefully. Most of the time, IP cores is having different input output specifications with new platform. The Wishbone SoC interconnection Architecture is aim to provide a good solution for SoC integration issues by having common interface specifications. In this project, the Wishbone on-chip computer bus for 32-bit cores is implemented in system verilog along with three different arbitration schemes which are fixed priority, round robin, and priority control. On top of that, the optimum transfer size for Wishbone bus in terms of bus throughput and average wait cycle is presented as well. It is found that the optimum transfer size for Wishbone bus is 64 bytes. Finally, the Wishbone bus is used to examine the bus performance of different arbitration schemes in Modelsim simulation. Round robin arbitration scheme is the best among three arbitration schemes in terms of bus throughput, logic complexity, and maximum wait cycle.

ABSTRAK

Dalam perkembangan SoC, keserasian teras IP adalah salah satu cabaran yang perlu ditangani dengan berhati-hati. Kebanyakan masa, teras IP mempunyai spesifikasi output input yang berbeza dengan platform yang baru. Wishbone SoC sambungan arkitek bertujuan untuk menyediakan satu penyelesaian yang baik untuk isu-isu integrasi SoC dengan mempunyai spesifikasi perantaraan yang sama. Dalam projek ini, Wishbone bas komputer untuk 32-bit teras dilaksanakan dalam Sistem Verilog bersama-sama dengan tiga skim pengawal trafik bas yang berlainan. Skim tersebut ialah keutamaan tetap, robin bulat, dan kawalan keutamaan. Selain itu, saiz optimum pemindahan untuk bas Wishbone juga dicari dari segi kadar pengeluaran bas dan kitaran tunggu purata. Saiz optimum pemindahan untuk bas Wishbone didapati adalah 64 bytes. Akhir sekali, bas Wishbone juga digunakan untuk memeriksa prestasi bas Wishbone untuk skim pengawal traffic bas yang berbeza dalam simulasi Modelsim. Skim pengawal traffic bas robin bulat merupakan yang terbaik antara tiga skim dari segi kadar pengeluaran bas, kerumitan logik, dan kitaran tunggu maksimum.